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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/711,037	08/19/2004	Po-Wei Chao	REAP0088USA	5036

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EXAMINER	
BLOOM, NATHAN J	

ART UNIT	PAPER NUMBER
2624	

NOTIFICATION DATE	DELIVERY MODE
01/09/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/711,037	CHAO, PO-WEI	
	Examiner	Art Unit	
	NATHAN BLOOM	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08/26/2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *23-38* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *23-38* is/are rejected.

7)☒ Claim(s) *24,26,32, and 34* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to the newly presented claims have been considered but are moot in view of the new ground(s) of rejection. See the rejection below for further explanation.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 31-38 are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. Supreme Court precedent[1] and recent Federal Circuit decisions[2] indicate that a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. While the instant claim(s) recite a series of steps or acts to be performed, the claim(s) neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. For example claim 31 describes the steps of determining an

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[1] *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876).

[2] *In re Bilski*, 88 USPQ2d 1385 (Fed. Cir. 2008).

interpolation direction, and interpolating the pixel data with respect to this information, but does not describe the steps as being performed by a device or apparatus.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 23, 25, 27-28, 30-31, 33, 35-36, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma (US 6965705) in view of Ji (US 2005/0073607), in further view of Roche (US 4772956).

Instant claim 23: An intra-field interpolation device for converting an interlaced video signal to a de-interlaced video signal, the device comprising:

a first pixel difference unit receiving an image field of the interlaced video signal for determining a pair of pixel difference sets on either side of a normal axis of a target pixel in an alternate field of the interlaced video to thereby generate two candidate blending angles for the target pixel; [Ma has taught a direction interpolation method, but has not taught the particular method outlined below. However, *Ji has taught in paragraphs 0092-0094 and Figures 6A-6L the generation of a series of pixel differences that or on either side of a normal axis of a target pixel "x" in an alternate field. Furthermore, since the number of angles being measured is*

greater than 2, then at least two candidate angles are generated. The system described by Ji describes a line average and directional interpolation system and method that chooses between performing the ELA and EDI based on two sets of pixel differences, and performs the well-known EDI if appropriate. It would have been obvious to one of ordinary skill in the art to substitute the EDI taught by Ma for the method taught by Ji to interpolate the pixel values based on direction, with a reasonable expectation for success.]

a second pixel difference unit receiving the image field for determining two reference pixel differences in the image field being along a reference angle on either side of the normal axis of the target pixel; [*See figures 6A-6L wherein at least two differences in the image field along at least one reference angle is determined (each angle is determined in pairs), but Ji and Ma have not taught the determination of the various pixel differences 6A-6L using two pixel difference units. However, as evidenced by the teachings of Roche (column 4 line 67 to column 5 line 8), it was well known to one of ordinary skill in the art at the time of the invention to divide a task (such as separate algorithms) between multiple devices to reduce computational time. It would have been obvious to one of ordinary skill in the art to combine the teachings of Ma in view of Ji with the teachings of Roche to replace the single pixel difference unit of Ji with two units to process the differences in parallel in order to reduce the computational time of the video frame interpolation process.*]

an angle selection unit being coupled to the first pixel difference unit and the second pixel difference unit for determining an optimal blending angle according to the two candidate blending angles determined by the first pixel difference unit, and the two reference pixel differences determined by the second pixel difference unit; and [*Ma in view of Ji and Roche has*

taught the selection of the angle based on the pixel differences from the first and second pixel difference units based on certain criteria in paragraph 0095 of Ji.]

a weighted blending unit being coupled to the angle selection unit and receiving the image field for blending a plurality of pixel values in the image field along the optimal blending angle to thereby generate the target pixel in the de-interlaced video signal. [*Interpolation (weighted blending) in the chosen direction (optimal blending angle) has been taught by Ji in paragraph 0101.*]

Instant claim 25: The device of claim 23, wherein the second pixel difference unit is for determining the two reference pixel differences being along a 45 degree reference angle on either side of the normal axis of the target pixel. [*The second pixel difference unit as taught by Ji in view of Roche teaches the differencing of pixels at a plurality of angles, but has not explicitly specified that the angle is 45 degrees. However, it is clear that since pixels are the same size that a pixel difference as depicted in figures 6J and 6K of Ji are 45 degrees (for 45 degrees rise/run is one/one = 1, thus two pixels up and two pixels over are 2/2 = 1, is a 45 degree reference angle).*]

Instant claim 27: The device of claim 23, wherein the weighted blending unit is for performing weighted blending of a plurality of pixels values further along the normal axis to generate the target pixel. [*Pixels shown in figures 2 and 4-5 are along (the terminology "along" is very broad and can mean: beside, near, next to, adjacent, etc..) the normal axis.*]

Instant claim 28: The device of claim 27, wherein the weighted blending unit is for performing a two-phase weighting algorithm to interpolate the target pixel; pixel information along the normal axis being weighted according to a first weight, and pixel information along the optimal axis being weighted according to a second weight. [*As per the rejection above, the pixels used to interpolate along the optimal blending angle are "along" the normal axis, and the pixel data is blended according to the weights defined by Ji in paragraphs 0101-0107.*]

Instant claim 30: The device of claim 23, wherein the first pixel difference unit is for utilizing a first pixel difference algorithm being substantially different from a second pixel difference algorithm utilized by the second pixel difference unit. [*Ji in view of Roche has taught the two differencing units, but has not specified which differences depicted in figures 6A-6M are done on each unit. However, as can be seen by figures 6A-6M the difference algorithms are different for each angle since different sets of pixels are subtracted. Therefore, regardless of the selected differences performed by the two units, the first and second pixel differences performed by the units will be different.*]

Instant claims 31, 33, 35-36, and 38: Claims 31, 33, 35-36, and 38 describe the method performed by the device of claims 23, 25, 27-28, and 30. As per the rejection of claims 23, 25, 27-28, and 30, the device and the method it performs have been disclosed. Furthermore, Ji in paragraph 0010 and figures 1 and 2 has taught the measuring of an edge gradient using a series (plurality) of pixels. It is implied that these pixels have been received from an image source of some type, else there would be no values to operate on.

5. Claims 29 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ma (US 6965705) in view of Ji (US 2005/0073607) and Roche (US 4772956) as applied to claims 23 and 31, and in further view of De Haan (PCT Pub WO03/038753, also published as US 7206027).

Instant claim 29: The device of claim 23, further comprising a low-pass filter for removing noise from the interlaced video signal. [*Ma in view of Ji and Roche do not teach the pre-filtering of the interlaced data. However, De Haan in column 2 lines 1-7 and column 3 lines 17-43 (US 7206027) has taught the LPF pre-filtering to decrease the impact of edges and decrease the noise sensitivity of deinterlacing (interpolation). Ma and Ji have both taught deinterlacing methods. It would have been obvious to one of ordinary skill in the art at the time of the invention to improve the deinterlacing method of Ma in view of Ji by adding a prefiltering step as taught by De Haan to decrease the noise of the deinterlaced image/video.*]

Instant claim 37: Claims 37 describe the method performed by the device of claim 29. As per the rejection of claim 29, the device and the method it performs have been disclosed. Furthermore, Ji in paragraph 0010 and figures 1 and 2 has taught the measuring of an edge gradient using a series (plurality) of pixels. It is implied that these pixels have been received from an image source of some type, else there would be no values to operate on.

Allowable Subject Matter

6. Claims 24, 26, 32, and 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 24(32) and 26(34) contain subject matter that is not in the known or cited prior art. In particular, claim 24(32) contains the additional limitation that the candidate angles are determined based on a measured horizontal gradient, and claim 26(34) contains the limitation that the previously interpolated pixels values are used to determine the new pixel value.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan Bloom whose telephone number is 571-272-9321. The examiner can normally be reached on Monday through Friday from 8:30 am to 5:00 pm (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella, can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Matthew C Bella/
Supervisory Patent Examiner, Art Unit 2624